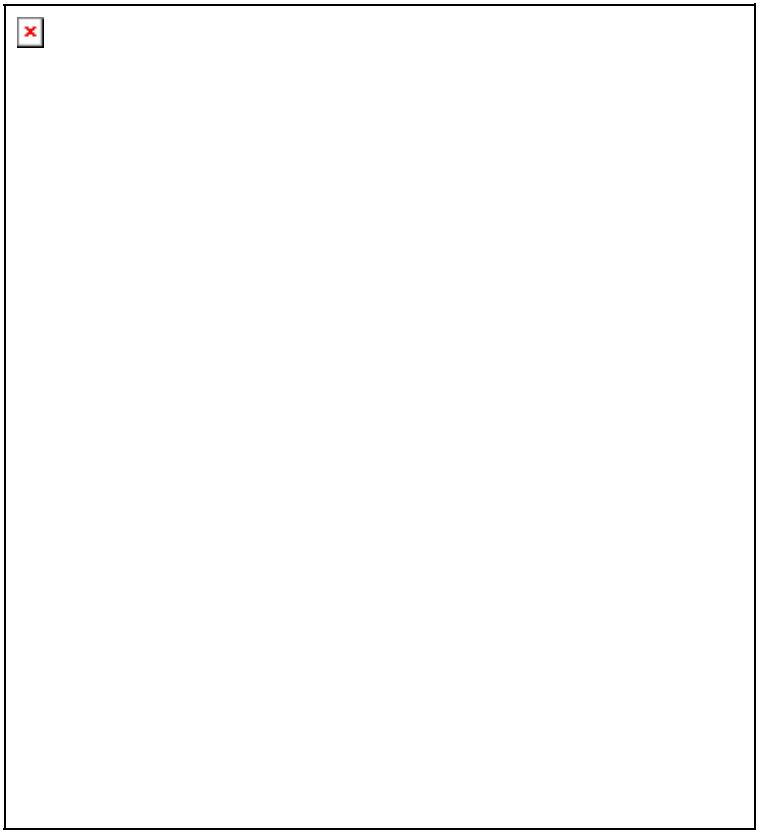
xiaojingling

Elf Series Handheld Digital Scopemeter (Oscilloscope)

ZB-1201 Handheld Digital Scopemeter
ZB-1201S Handheld Digital Oscilloscope

User manual

www.aitendo.co.jp



Appearances of ZB-1201S Handheld Digital Oscilloscope

instruction：

1. Port of Scopemeter probe (1MΩ, ≤20pF,300Vp-p)
2. Output port of waveform (1V, 1 KHz)
3. Port of external trigger signal (TTL,TTL×10)
4. Charge port (⏚)
5. Shift of channel (5V/DIV ～ 10mV/DIV)
6. couple switch (DC、AC、GND)

Appearance of host machine (ZB-1201S)

Letter to users

Dear user：

Thanks for your choice of the **Elf Series Handheld Digital Scopemeter (Oscilloscope)** made by us.The **Scopemeter** serves and accompanies you at any time tending to offer a swift and high-efficiency work.

The instruction is to introduce systemically you how to use it as well as concerned notices, please read it carefully before to use. In this instruction, we provide and cause the product display consistent with real product as far as possible, if any differential, the real display of machines will govern.

We assure the Function and specification in accordance with the instructions noticed which is suitable for Elf Series.

Accompanied with host machine a product warranty card is given. Please fill in it carefully. We will provide you limited service(such as change， maintain , repair)according the content .

Thanks !

Notices

★Make sense of the instructing contents in this Instruction correctly;

★The 4AH lithium polymer battery built in the Scopemeter shall use the built-in dedicated charger rather than any other charger or DC source adapter to avoid the occurrence of hazard.

★ Please pay attention to the range of input voltage so as to prevent from the damage of instrument.

★ Never set the Scopemeter in an unstable stand or table to avoid of a falling down and subsequently resulting in the damage of products.

★ Never set the Scopemeter nearby the hot body to prevent from damage of instrument due to superheating.

★ The liquid substance is forbidden to flow into the Scopemeter.

★ Never set the Scopemeter under a heavy load.

★ Never use the liquid or gas detergent, but a dry cloth for cleanness is available.

★ Make sure of it is fully charged before a long time in storage, turn off the host machine you can get a quick charge.

★If the Li-polymer battery need a change, please contact us from the way listed at the back cover.

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Chapter I

Introduction

1.1 Unpacking for check

When get a new Elf **Series Handheld Digital Scopemeter (Oscilloscope)**, please have a check following the procedures below:

To checks whether or not exists damage due to transportation.

If any damage happens to packing box or foam protective mattress, please keep it and contact with the salesman.

1.2 Check of accessories

The accessories which have been explained in the Instruction Manual shall be checked whether or not they are missing or damaged, if any, please contact with the salesman.

1.3 Check of complete machine

If any damage happens to the appearance of instrument or malfunction occurs, please contact with the salesman. Please keep the packing if any damage is caused in transportation.

1.4 Introduction of product

Elf **Series Handheld Digital Scopemeter (Oscilloscope)** is manufactured in accordance with the requirements of research, development, production, debugging and repair of majority electronic engineers. Contrast with traditional one, it has a built-in lithium battery and can work without an external power supply; it is convenient for moving, especially for in situ application; it has multi trigger types, including automatic, common and single trigger , capable of locking and subsequently storing the non-periodicity signals which a traditional one fails to probe; it features compactness, speciously, friendly interface.

Elf **Series Handheld Digital Scopemeter (Oscilloscope)** may swift and accurately detect the faults happening to circuit, serve as an electronic engineer's right hand, and will surely bring you a great convenience in work.

1.5 Function

★ Functions of Scopemeter

★ Function of multi meter (only zb1201 has the function)

1.6 Characteristics

★ Resolutions (320*240) takes more information, to give a visualized interface

★ using large bulk battery for power supply, with the bracket, and easily to hold, all this made it suitable for more kinds of application condition

★Waveform and waveform parameter can be displayed simultaneously on a screen, 15 parameters can be displayed, such as max. Value, min. value, means value, mean square root，peak to peak value，periodicity，frequency， positive pulse width, negative pulse width，rise time，fall time

★ It has an automatic setting function to set automatically time base and amplitude range (zb1201 has the function only).

★ to be displayed the menu in Chinese (or English), easy to operate

★ It is of compactness（118mm ×200mm ×45mm）, and in light weight (host machine ＜ 0.7 kg)

Chapter II

Fundamental operation for start up/power off

2.1 Charge

10 hours of charge shall be ensured when it is charging for the first time, after that, 6 hours once is enough. The host machine shall be power off when charging, (or else it is harmful to the battery).

2.2 Power on

The figure listed below is the keyboard of the Scopemeter..

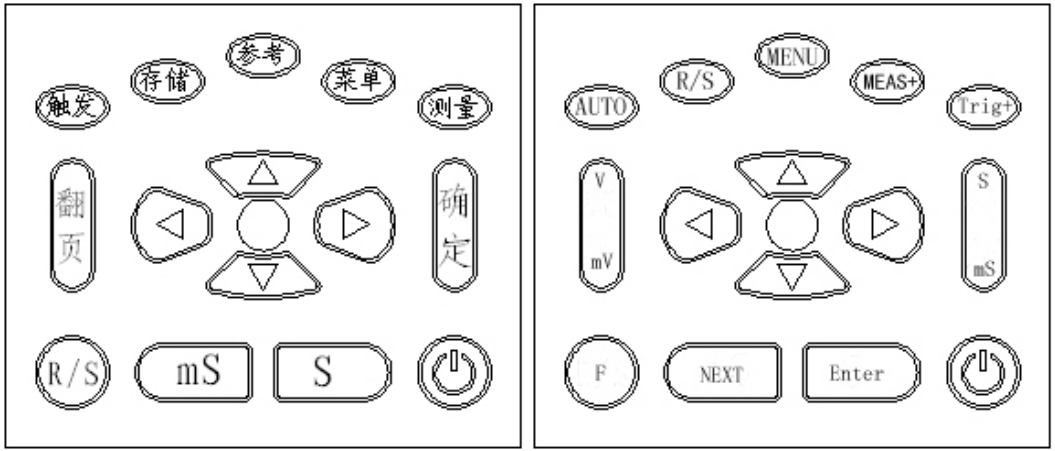


Figure 3: Keyboard of ZB-1201S Keyboard of ZB-1201

触发=Trig+ Open/close trigger menu; 存储 (SAVE) Open "SAVE" menu;

参考 (REF) Open Reference Waveform Channel and display it on the screen;

菜单=MENU To display other setting options about host machine;

测量=MEAS+ Open/close "measure" menu; 翻页=NEXT change the option to be performed;

确定=Enter perform the selected option; R/S stop sample and lock the status of some waveform;

S mS zoom in or zoom out the time base; V mV zoom in or zoom out the amplitude of voltage;;

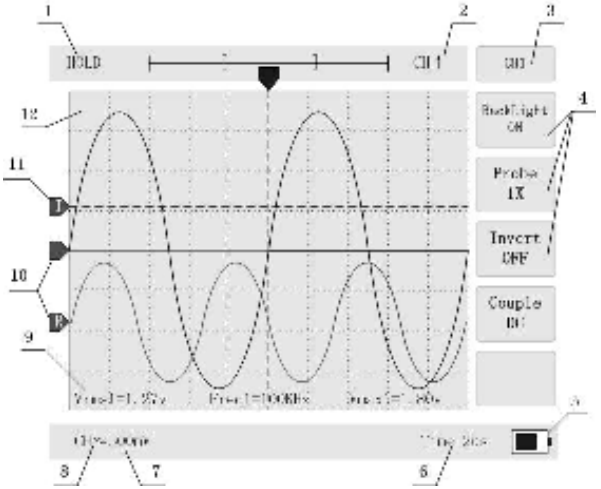
power on/ power off; AUTO To automatically display a fit waveform;

↑ ↓ move the position of some waveform up/down;

← → move the position of some waveform left/right;

F (function menu) Entrance of the “SAVE”, “REF” or “MULTIMETER“menu;

Press the key “ ” (power on/power off) to open **Scopemeter** and the startup interface is first given; Then press any key or wait for several seconds, subsequently, the oscilloscope interface is automatically given, as in Figure 4.



1. running status(run or stop)
2. types of trigger
3. the name of current menu
4. Current menu option
5. battery status
6. time base
7. amplitude of voltage
8. couple status
9. option measured automaticly
10. Channel reffernce position
11. position of trigger
12. grid of waveform

figure 4：Interface of the Scopemeter

This interface consists of three sections, the main section refers to the waveform display, the right section refers to the setting section, the below section refers to the status column.

Waveform display section is involved in the grid, waveform, the indicator indicating the position of waveform, the identification when waveform is at scanning mode as well as the measurement parameter group the user chose. Every 25 display points produces a grid, the lateral direction refers to time axis, with range of X s / div , X us / div or X ns / div per grid, while the longitudinal direction refers to amplitude axis, with range of X V / div , X mV / div per grid. The arrowhead with number or letter indicates the zero of amplitude of waveform. 1 means the first channel, and 2 the second channel; M means the channel of calculation valve. R means the reference waveform channel, the “RUN” or “HOLD” on the above left means the waveform is in scanning position or has been locked in. The parameters to be measured, as measurement signal’s periodicity, amplitude, peak value, Root mean square value mean, mean value, can be displayed near to the bottom of grid in accordance with the selection of user.

The second section is **setting section**, the input coupling types such as DC, AC , ground, attenuation multiple of probe, display of positive and negative phases. May be arranged by yourself in accordance with your requirements

The status column shows the channel of measurement, input types of channel, the channel selected at current, (the channel selected shall be displayed using reverse color, namely white foreground against black background, but the unselected shall be displayed normally, namely black foreground against white background.), amplitude and arrange of each channel, horizontal time base, electric quantity of lithium battery as well as current time.

2.3 System configure or automatic

The purpose of the system configure is to give an optional setting arranged by user yourself, Then you can do you work easily. All you need to do is that set up you host machine. And then save it immediately. So it appears the status you set next time it power on. Such as amplitude, time Backlight, language, options of measure etc, some is listed below:

Press MENU key to display the menu (figure 5), then press NEXT key select some option you need, press Enter to perform it 。

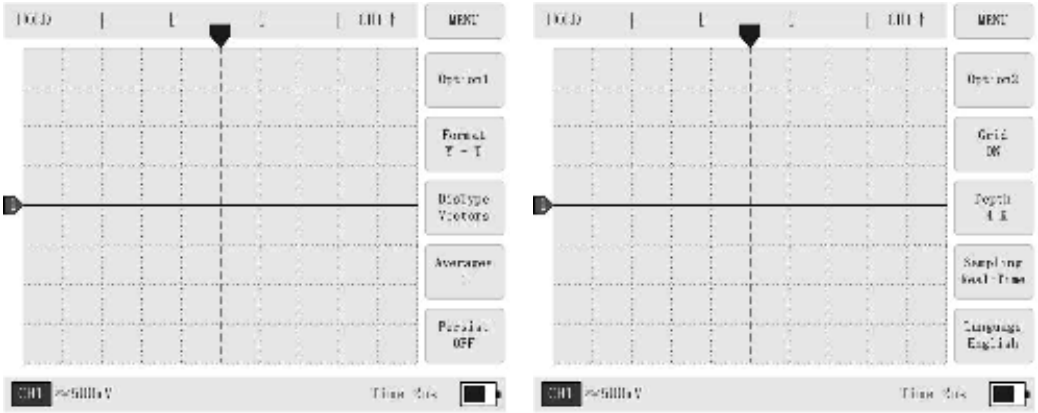


Figure 5：Interface of MENU

The menu will be displayed by pressing the "菜单"(menu) key, as shown in Table below.

Table 2

Function menu	Option	Description
Time format	Y-T X-Y	y-t mode shows the relative relation between vertical voltage and horizontal time. x-y mode shows the amplitude of Channel 1 on the horizontal axis, and shows that of Channel 2 on the vertical axis.
Display type	Vectors Dots	Displayed by tie-line between sampling points To display sampling points directly
Average	1、2、4、8、16、32、64	To set the average sampling time by pressing “Enter” key, from 1 to 64，advancing by multiples of 2 step by step
Persist	On Off	To open the waveform retaining function To close the waveform retaining function
Grid	On Off	To display the screen background grid To close the screen background grid
Sampling	Real-time	The sampling mode is set as real time sampling
Language	简体中文 English	To set up the language displayed on the screen

Options set up directly by the key ：

horizontal shift is controlled bySormS; vertical shift is controlled byVormV(but zb1201s)。

Automatically measured option can be select from the Measure Menu, detailed information is listed

below

2.3.1 Setup of automatically measured option

host machine setup the amplitude and the time base automatically, so as to suit for the observation, when the 自动(auto)key pressed, it start to schedule.

Options listed below maybe set by the host machine:

Table 3

Function	Setup
Display format	Y-T
vertical “V/div”	Adjustment to a proper division
Vertical division adjustment	Coarse adjustment
Signal inversion	Close
Horizontal position	Center
Horizontal “S/div”	Adjustment to a proper division
Trigger type	Edge
Trigger source	Automatically detect the channel that has signal input.
Trigger level	Midpoint setting
Trigger mode	Automatically

“R/S”: Run or stop waveform sampling.

2.3.2 Save setup

The method mentioned above can be an easily way to use the host machine.

When you have setup the option you want to setup, you can save it, for the use of next time, or

leave it without save, made it be same as before.

If you want save it, you can press the key F (function) to enter the function menu, select the "**save**" menu, press "enter" (twice) to set the storage type as "**setup**", then press NEXT to select the "**save**", press the Enter to save the parameter.

2.3.3 Select or setup of channel

The CH means the channel for input signal, and the MATH or REF has the similar conception as CH, so you can think it to be another channel when operate on the MATH or REF.

Application of Vertical system (↑ , ↓, V and mV)

1. the key ↑ or ↓ is set to adjust the vertical position of channel, and the DPI is changed with the vertical shift.
2. "V" or "mV" is set to adjust the vertical DPI for all the channel, If the channel is open. FFT is displayed in percentage, and also "V" stands for zoom out, "mV" stands for zoom in
3. Only the opening channel (namely selected) can be adjust by the key ↑ , ↓ , V or mV . And the waveform of REF is adjusted based on the condition it saved.

2.3.4 Channels run/stop

As a input channel CH samples continuous or stop at the position for a observation, this can be done by pressing the key R/S or determined by the host machine(if the machine is set to the trigger mode)

NOTICE:

On the condition that the R/S (run or stop) pressed (namely the machine in the HOLD status), the vertical system also can be adjusted (zoom in /zoom out) to some extend

2.4 output of waveform for test

A 1 kHz/1v waveform is provided at the top of the Scopemeter, it is a ring where you can get the signal easily with the probe. The ground of it is connected with main board, you can have a measure without extra ground, and it provides a continuously output.

2.5 power off

When you have finished you work, you can power off the machine with the key (power off/power on). When the battery goes out you can use the machine by the charged directly or fully charge the battery again. But it is better to fully charge the battery, or else it is harmful to the battery.

Chapter III

Function of Scopemeter

On the initial status, the machine displayed as figure 6. or else if it shows the interface of multimeter, please press the key “F”(function) , enter into the DMM menu, then press next to select the “waveform”, and press enter to return the initial interface.

Before using the machine, it is better have a setup of the vertical system or the horizontal system to get a steady and clear waveform, sometimes trigger also need to be have a setup.

You can do it as follows:

3.1 Couple of CH

Main interface display sub option as below,

Table 5 Couple of channel for measure

Function menu	set	description
Couple	AC	Without DC parts
	DC	All the signal
	Ground	Without any signal outside
Probe	1X	Set it to the appropriate one as your probe set
	10X	
	100X	
	1000X	
Invert	ON	Display in an opposite phase
	OFF	Display in normal

At the main interface, press next to select the coupling option, then press enter"key to select the AC option so that the AC coupling type is set. The direct-current component contained in measured signal is obstructed. The waveform display is given in Figure 6

At the main interface, press next to select the coupling option, then press enter key to select the DC option so that the DC coupling type is set. The entire signal will be getting. The waveform display is given in Figure 7.

At the main interface, press next to select the coupling option, then press enter key to select the GROUND option so that the GROUND coupling type is set. No signal outside will get. The waveform display is given in Figure 8.

The input signal is a sine waveform with DC bias.

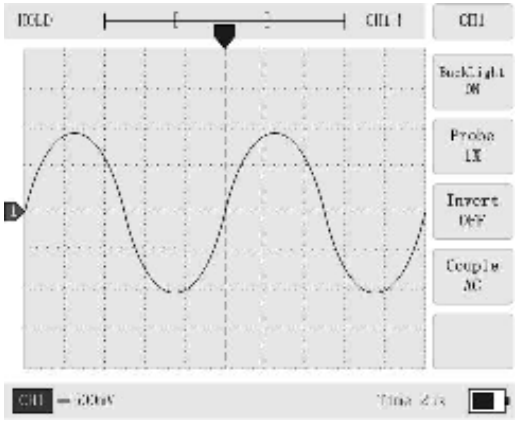


Figure 6 : Signal at the AC status

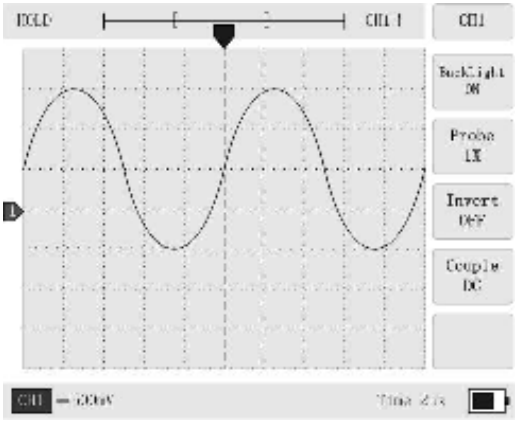


Figure 7: Signal at the DC status

The couple operation of ZB-1201S is determined by the couple switch（detailed information is marked on the **Appearance of host machine**）

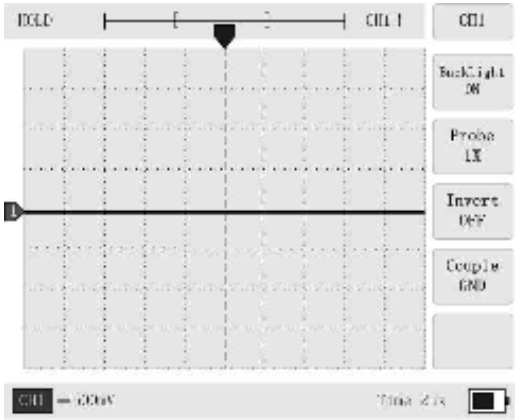


Figure 8： Couple set to ground

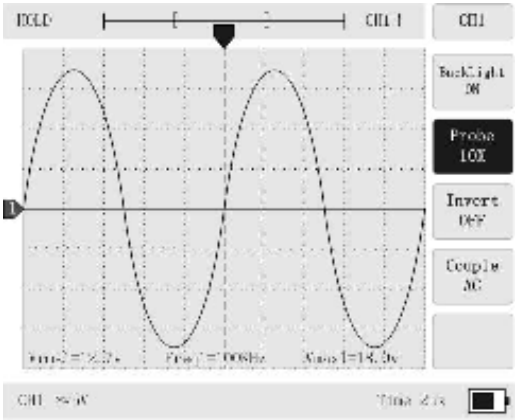


Figure 9： Waveform with probe set10:1

Proportion of adjustment probe

Corresponding to the attenuation coefficient, we shall make a corresponding adjustment of the probe attenuation proportion coefficient in channel operation menu. For example, when the attenuation coefficient of probe is 10:1, the proportion of input channel of oscilloscope shall be set to 10X so that the scale displayed is consistent with the measures data.

The demonstration given in Figure 9 refers to the setting when the probe of 10:1 is applied and shall be indicated by vertical scale.

At the main interface, press next to select the **probe** option, then press enter key to select the probe proportion, respectively as 1X, 10X, 100X and 1000X. Please refer to Table 6.

Table 6

Probe attenuation coefficient	Setting of corresponding menu
1：1	1X
10：1	10X
100：1	100X
1000：1	1000X

Inversion setting of waveform

Waveform in inversion: The signal displayed is relatively inverted to 180 °with electric potential. Press next key to inversion option, press enter key to select the On/Off of inversion.

3.2 shift of CH

The amplitude shift is set by V and mV . the range of DPI is from 10mv to 5V（10mV、20mV、50mV、100mV、200mV step to 5V）.

Press the key ↑ and ↓ is to adjust the vertical position. The indicator will move up or down with the process of adjusting, and marks the position.

3.2 Setting of horizontal system

3.2.1 Horizontal control knob

The horizontal control knob can be used to change horizontal time base, the location of current waveform in memory (memory displacement) and the location of triggering in memory (triggering displacement). The horizontal center of screen is the time reference point of waveform. The waveform will expand or contract relative to the screen center, if the horizontal scale is changed. The change of horizontal position can change the waveform position relative to a trigger point.

Key ← and →: the two keys can be used to adjust the horizontal position of channel waveform (including mathematical operation). The analysis degree of this control knob changes with that of the time base.

Key S and mS: the two keys can be used to adjust the main time base, i.e. S/div.

Sign description:

1. "[ ]"represents the position of current waveform window in memory.
2. "▼" indicate the position of a trigger point in memory.
3. The horizontal time base (main time base) is indicated in S/div.

Terminology explanation

Y-T mode: in this mode, axis Y shows amplitude, and axis T shows time.

X-Y mode: in this mode, axis X shows the amplitude of Channel 1, and axis Y shows that of Channel 2.

.

3-3 FFT function (ZB-1201 has the function only)

FFT as a usual function, is used many fields. Such as the waveform analysis, communication problem diagnosis, power quality analysis etc.

The interface of FFT is showed in figure 10 listed below0. and the sub option of FFT is listed in the table 4

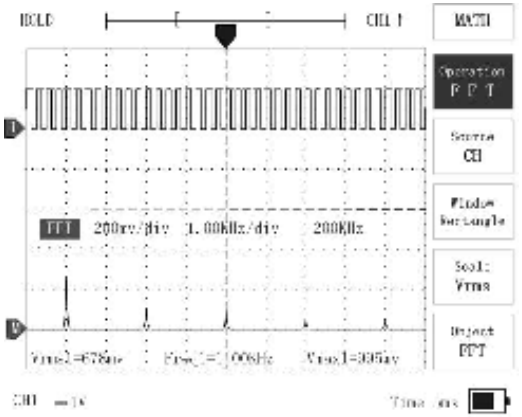


Figure 10: interface of FFT

Table 4

Menu	Setup	Description
Source A	CH	CH is the only source in zb1201
Window	Rectangle Hanning Hamming Blackman	4 kinds of operate of fft
Vertical scale	Vrms DBVrms	effective value of voltage(v/div) effective value of voltage (db/dive)
Object	FFT CH	Set operate objects FFT Set operate objects input waveform

3.4 Automatic measurement function

Press "MEAS+" (measure) key to open the measurement interface，the interface of measure has six pages. The first page is as the figure 11 listed below:

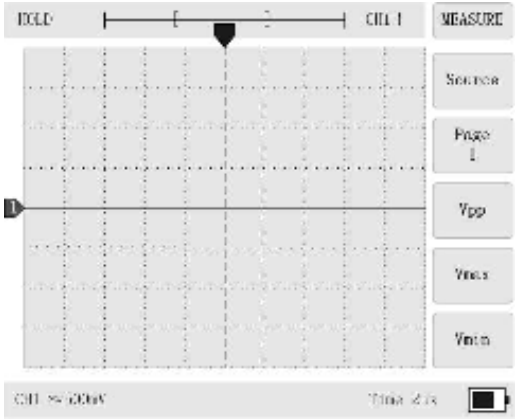


Figure 10: interface of measure

All the option listed below is set to be measured by the host machine

Table 5:

Function menu	Description	abbreviation
peak-to-peak value	To measure the peak to peak value	Vpp
Maximum	To measure the maximum value	Vmax
Minimum	To measure the Minimum value	Vmin
Average	To measure the average value	Vavr
Root mean square	To measure the Root mean square value	Vrms

Top value	To measure the Top value	Vtop
Base value	To measure the base value	Vbas
Frequency	To measure the signal frequency	Freq
Cycle	To measure the time period or cycle duration	Prid
Positive pulse width	To measure the positive pulse width of signal	+Wid
Negative pulse width	To measure the negative pulse width of signal	-Wid
Delay1	To measure the signal delay 1	Dly_A
Delay 2	To measure the signal delay 2	Dly_B
Rise time	To measure the rise time of signal	Rise
Fall time	To measure the fall time of signal	Fall

Operating description：

The measurement display interface can be accessed by pressing the MEAS+ key, press the NEXT key to select the setting option, press Enter key to perform it.

Attention shall be paid that only three kinds of values can be measured simultaneously, if the fourth value is selected and measured, the measurement of the first value will be automatically turned to a situation without measurement.

After that you can select the "source" and press Enter to clear all the measure option.

3.5 Save function

Press the F (function)key to open the interface of function(Figure 12).Select the "SAVE" (or store) press Enter to enter the **save** menu(zb1201s press the key save directly to enter the **save** menu), then

select/change the “storage”, select the “save” option and press **Enter** to perform the save function. The waveform is stored in the position you selected.

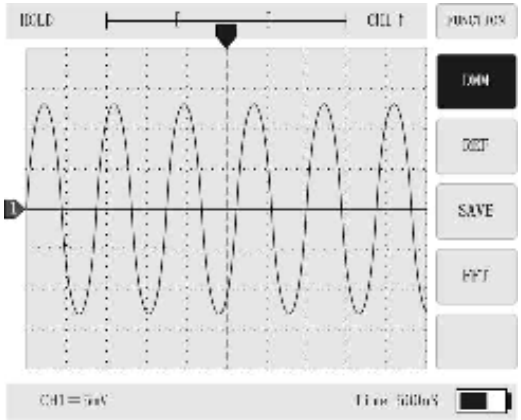


Figure 12: Interface of function

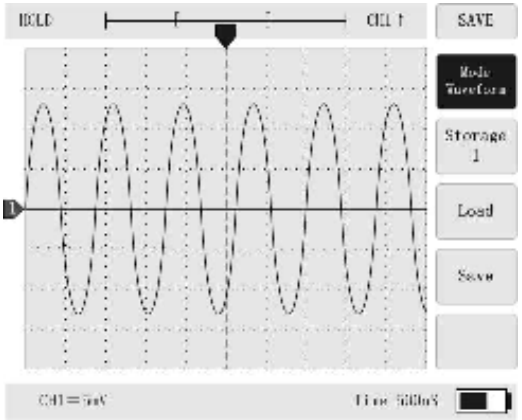


Figure 13: Interface of save

There are two kinds of way to reload the saved waveform into memory.

The first one is from the interface of save where a reload option is given, select it and press **Enter** to perform it, then the waveform(position correspond) will displayed on the screen.

And the other one is from the interface of **REF**, it is a function that compare the current waveform with reference waveform simultaneously, to locate a problem quickly.

The menu of save is listed below (table 6).

Table 6

Function menu	Setup	Description
Type	waveform setup	The object to saved is waveform The object to be saved is parameter of host machine
Storage Position	1、2、3、 4、5、6	The location to be saved form waveform.
Load		Reload the saved waveform into memory according to the position
Save		Save the waveform or parameter according to the type

3.6 REF function

During the actual testing process, the failure reason can be determined by using a Scopemeter to measure and observe the waveform of related subassemblies, and making a comparison between the waveform and the reference. This approach is more applicable where detailed reference waveforms for electric circuit action spot are provided.

The reference waveform menu can be displayed by pressing the "REF" key, as shown in Figure 13, and the setting description is shown in Table 7

Press the F (function)key to open the interface of function(Figure 12).

Select the "REF",press Enter to enter the "REF" menu, then select/change the "storage" by pressing the Enter, and the waveform will changed the with change of position.

The detailed information of the REF is listed below:

Table 7

menu	Setup	Description
Storage position	1、2、3 4、5、6	The waveform to be reloaded into memory

Status	valid	If some waveform is stored in the position it shows valid or else it shows invalid
	Invalid	
Source	CH	The waveform to be displayed is from CH
Invert	ON	Set the waveform to be displayed inverted
	OFF	Set the waveform to be displayed normal
Object	REF	REF is to be operated on(such as Position control ,voltage control)
	CH	CH is to be operated on

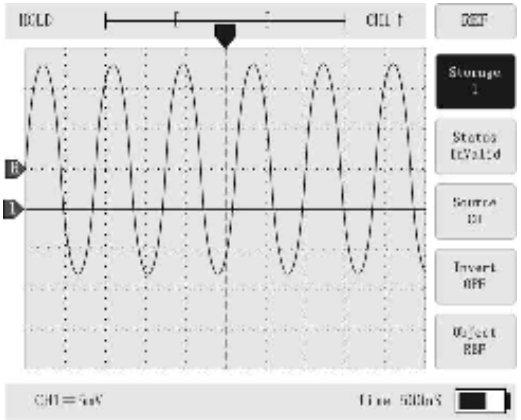


Figure 14: Interface of REF

Direction:

1、 In the interface of REF, six positions are given for the display of waveform. You can

change it pressing Enter, if storage is the current selected option. Or else you select it by pressing NEXT some times first.。

2、 The “Source” and the “Status” show the status of the waveform.

3、 The key V and mV is to adjust the shift of waveform in vertical.

4、 The key ↑ and ↓ is to adjust the position of waveform in horizontal.

Notice:

1. A storage with which the waveform is stored in the mode of X-Y is not applicable to reference waveform. In the state of REF menu, the storage site is displayed as “ineffective”.
2. The horizontal position and scale can’t be adjusted in the state of reference waveform.

Directions:

1. Location: some specific area for savage of waveform, named 1, 2, 3, 4, 5 and 6.
2. Load: some waveform stored to be restored to the memory from 1, 2, 3, 4, 5, or 6.
3. Save: not only waveform but also parameter can be saved.

3.7 Trigger function

Trigger function made it possible for observing some waveform, locking it, and displaying it steadily on the screen. Regular mode for trigger is auto, normal and once. Different mode it acts different,

Auto mode: display a steady waveform when meet the trigger condition or else display a unstable waveform.

Normal: display the steady waveform that meet the trigger condition.

Once: display the first steady waveform that meet the trigger condition.

Edge trigger is usual way of trigger. It comes from the comparison between input signal and the inner compare

signal. You can set it the falling side or rising side.

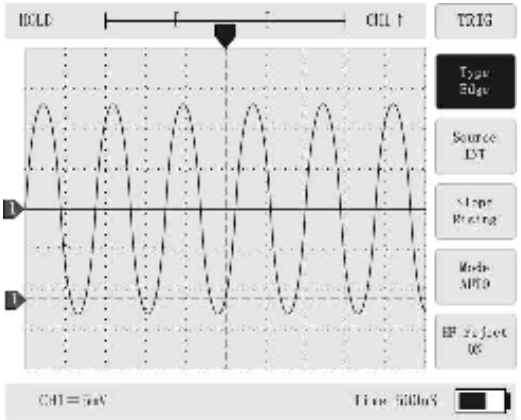
Press the key of TRIG+ to open the interface of trigger, as in Figure 15.

Entering the interface of trigger, trigger is set to be the default operate object. Press the key ↑ or ↓ the waveform will move up or down that is marked by a arrowhead with "T" inside. The current status about channel and types of trigger show at the top right.

Select the "type" and press Enter is to change the types of trigger (edge or video).

Press the key ↑ or ↓ is to change the vertical position(marked with a arrowhead with "T").

Press the key ← or → is to change the horizontal position waveform displayed on the screen(marked with "[ ]"on the top), to have some extra information for a long time.



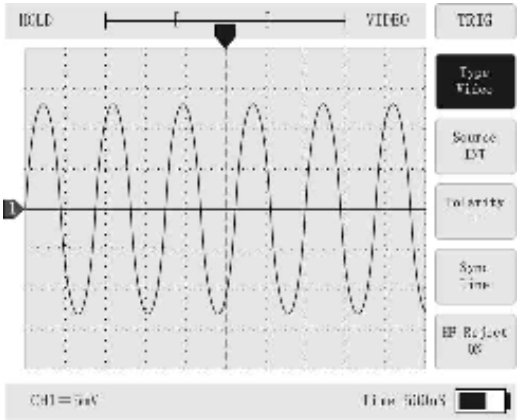


Figure 15: Interface of trigger

The detailed information of the REF is listed below:

Table 8

Menu	Setup	Description
Trigger type	Edge	Set rising /falling edge as trigger condition
	Video	Set line/field signal as trigger condition
Slope	Rising	Set rising edge as trigger condition
	Falling	Set falling edge as trigger condition
Video	Line	Set line Synchronous signal as trigger condition
	Field	Set field Synchronous signal as trigger condition
Source	Int	Set the signal of channel as the input signal
	Ext	Set the external signal as trigger condition
Mode	Auto	To set in such a way that the sampling waveform is allowable whether or not meet the condition of trigger.
	Normal	To set in such a way that sampling waveform is allowable only when trigger condition is met
	Once	Stop at the first trigger signal
HF reject	ON	Set high frequency reject on
	OFF	Set high frequency reject off

Video trigger separate the line signal and field signal from a complex signal.

It has two kinds of trigger condition namely line and fields. Set one as the trigger condition which meets the condition, synchronous separate circuit can adjust the voltage automatically.

Chapter IV

Multi meter

After power on (namely the initial status) press F enter the function menu, press Enter to enter the "multi meter" menu, press NEXT to select some menu listed on the right, then press Enter to perform the function you selected.

4.1 voltage measurement

Maximum input voltage： 600 Vrms CAT II, 300 Vrms CAT III。

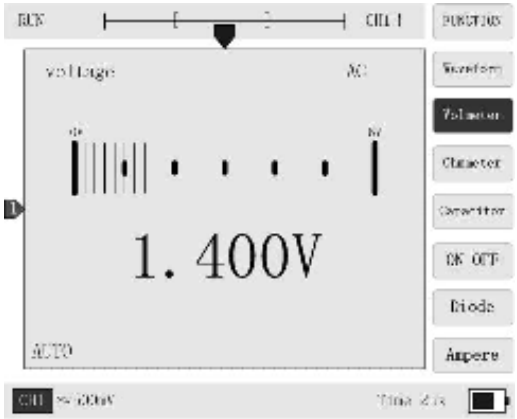


Figure 16: Interface of voltage measure

The main interface shows a simulation graph, measurement result lists below, measurement range lists left on the bottom.

To select "Volmeter" (using the key next) at first, press enter change between DC and AC.

Press V to get into the manual mode, it changed to another shift every time pressed;

press 自动 (auto)return auto mode;

The simulation graph gives a visualized measurement.

4.2 Resistance measurement

resistance measurement have six shift: 600Ω、6KΩ、60KΩ、600KΩ、6 MΩ、60 MΩ.

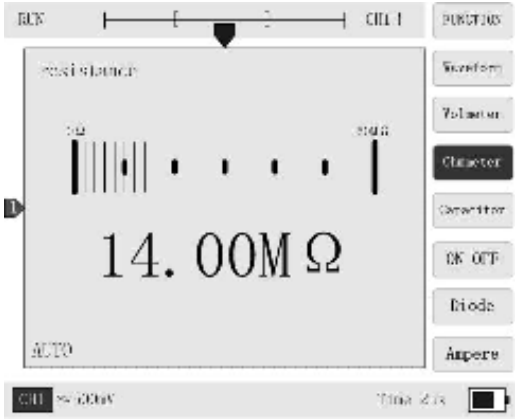


Figure 17: Interface of resistance measurement

The main interface shows a simulation graph, measurement result lists below, measurement range lists left on the bottom.

Press V to get into the manual mode, it changed to another shift every time pressed;

press 自动 (auto)return auto mode;

The simulation graph gives a visualized measurement.。

4.3 Capacitor measurement

Capacitor measurement has seven shifts. Range from 6.000nF to 6mF.

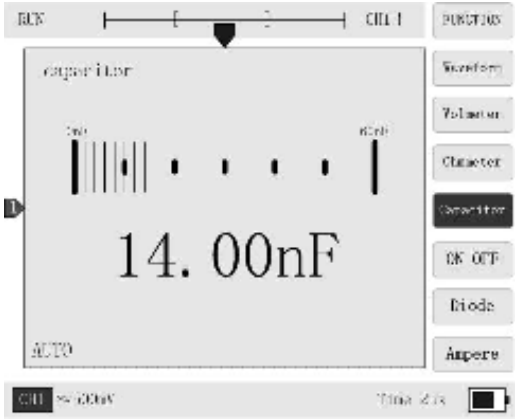


Figure 18: Interface of capacitor measurement

The main interface shows a simulation graph, measurement result lists below, measurement range lists left on the bottom.

Press V to get into the manual mode, it changed to another shift every time pressed;

press 自动 (auto)return auto mode;

The simulation graph gives a visualized measurement.。

4.4 Make-and-break measurement

It measures at the shift 600Ω.

It beep if the result of measurement less than 25Ω.

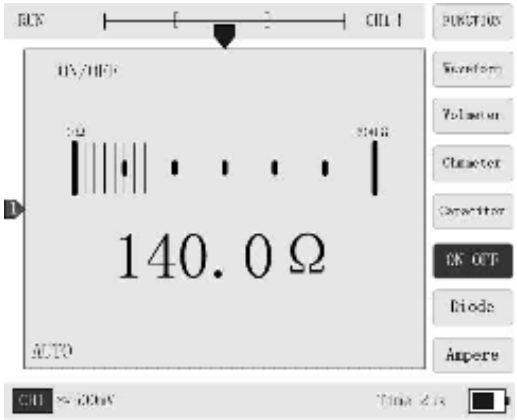


Figure 19: Interface of make-and-break measurement

The main interface shows a simulation graph, measurement result lists below, measurement range lists left on the bottom.

4.5 Diode measurement

It shows OL (overload) if the voltage drop is above 2V. And it beeps if the voltage drop is less 0.25V. The simulation graph gives a visualized measurement.

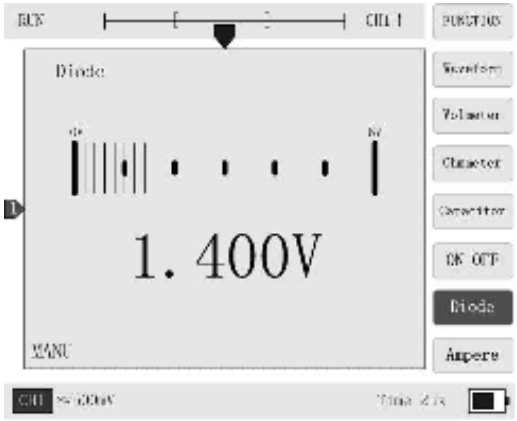


Figure 20：Interface of **diode measurement**

The main interface shows a simulation graph, measurement result lists below.

4.6 Current measurement

Current measurement have two shift: 60mA、600mA.

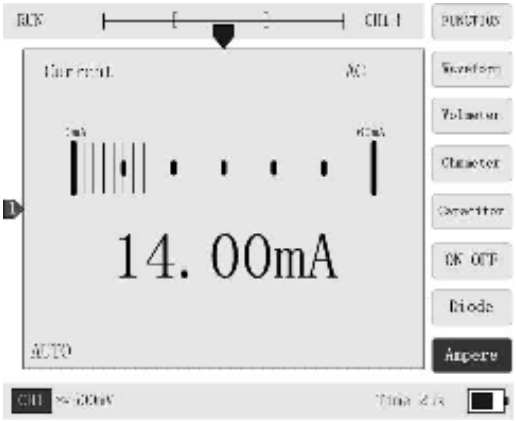


Figure 21：**Interface of current measurement**

The main interface shows a simulation graph, measurement result lists below, measurement range lists left on the bottom.

Press V to get into the manual mode, it changed to another shift every time pressed;

press 自动 (auto)return auto mode;

The simulation graph gives a visualized measurement.。

Appendix

Appendix A main specification

Specification of the Scopemeter

Specification of Scopemeter	
Bandwidth（-3dB）	20MHz
Sample	Max sample：80MSa/S
Channels	1
Couple	AC, DC or GROUND
Couple(AC)	< 10 Hz without probe < 1 Hz 10 MΩ 10:1 passive probe
Rise time	< 17.5 nS
Input independence	1MΩ，≤20pF
Max input voltage	1x CAT III 300 VAC 10x, 100x CAT III 600 VAC
Vertical resolution	8bit
Vertical sensitive	10mV/div-5V/div（ZB1201: 5mV/div-10V/div）
Horizontal resolution	50nS/div
Horizontal sensitive	50nS-5S
Depth-sampling	4K/channel
Memory	6 waveform+1parameter
Trigger mode	Auto, normal, once
Trigger type	Edge trigger, video trigger
Basic characteristic	

Screen	320×240；backlight
Communication	RS232 PC software(showwave.exe)
Battery	3.7V lithium battery 4AH
Adapter	input：100VAC-240VAC output：5V±**10%**DC 1000mA
Size	120mm×180mm×40mm
Weight	500g

Performance of Scopemeter(ZB-1201 only)	
Measuring range	6000
Input	Max input voltage: 600 Vrms CAT II, 300 Vrms CAT III。
On resistance	25Ω(at the shift of 600Ω), if less it beep
Diode measurement	>2V shows OL(overload) <0.25 beep
Capacitor measurement	6.000nF- 6mF (7 shifts)
Current measurement	60.00mA / 600.0mA (2 shift)
Resistance measurement	600.0Ω- 60.00MΩ (shift)
Voltage measurement	600.0mV- 6000V (5 shift) It shows OL if voltage is above 1000v at the shift of 6000V。

Specification:

(running at the temperature 10℃-25 ℃, 30 minutes after power on)

Specification of Scopemeter			
Vertical system: channels of Scopemeter			
Bandwidth（-3dB）	20MHz		
Precision	10 mV/div to 20 mV/div: ± 5%		
	50 mV/div to 5 V/div: ± 3%		
offset on vertical (DC)	±0.2 div ±2 mV ±0.5% offset		
Trigger sensitivity	DC to20 MHz: 0.8 div		
Specification of probe			
Rising time	X1 23.3nS		
	X10 17.5nS		
Bandwidth	X1 DC-15MHz		
	X10 DC-20MHz		
Input impedance	X10 10M(without Scopemeter input resistance 1M)		
Input capacitor	X1 46pF (without input capacitor of Scopemeter)		
	X10 15pF more or less		
Specification of Scopemeter(ZB-1201 only) ±（% of reading + % of range）			
Function	**Range**	**Frequency, measure current, load voltage**	**Tcal± 5 ℃/(year)**
Voltage			
DC Voltage	600.0 mV		0.3 + 0.08

	6.000 V		0.3 + 0.08
	60.00 V		0.3 + 0.08
	600.0 V		0.3 + 0.08
AC Voltage	600.0mV – 600.0 V	50 Hz – 1 kHz	1.0 + 0.2
		1kHz – 30 kHz	3.0 + 0.2
AC + DC Voltage	6.0000V – 600.0V	50 Hz – 1 kHz	1.0 + 0.2
		1kHz – 30 kHz	3.0 + 0.2
Impedance			
	600.0 Ω		0.5 + 0.2
	6.000 K Ω		0.5 + 0.2
	60.00 k Ω		0.5 + 0.2
	600.0 k Ω		0.5 + 0.2
	6.000 M Ω		0.5 + 0.2
	60.00 M Ω		1.0 + 0.2
current			
DC	60.00mA		0.5 + 0.2
	600.0 mA		0.5 + 0.2
AC	60.00mA – 600.0 mA	50 Hz – 1 kHz	1.0 + 0.2

		1kHz – 30 kHz	3.0 + 0.2
AC + DC	60.00mA – 600.0 mA	50 Hz – 1 kHz	1.0 + 0.2
		1kHz – 30 kHz	3.0 + 0.2
Capacitor			
	60.00 nF		2.0 + 0.2
	600.0 nF		2.0 + 0.2
	6000 nF		2.0 + 0.2
	60.00 μF		2.0 + 0.2
	300.0 μF		2.0 + 0.2
diode			
2.000 V 0.5 mA		2.0 + 0.08	
Make-and-break			
<25Ω, it beeps			

Appendix B Problem and resolutions:

1. power on without any response

Mostly it is the battery runs out, charge the battery for a while or fully charge it before use it again, or else it will not run either. If you can not run it, contact us instead.

2. Few seconds after power on it closed

Mostly it is the battery runs out, you can power on the host machine again, and have a look at the symbol of battery at the bottom; if it is not low in battery, charge it immediately

3. How to change between AC and DC

Press “option” at AC status, enter the DC status;

Press “option” at DC status, enter the AC status.

4. 10 times bigger or smaller than the actual voltage

Have a check of the “probe” sub option of the channel (CH1 OR CH2). Set it to the proper option such as x10 or x1.

5. Can not get steady waveform but a vary waveform shows.

Do some operation at the trigger mode;

Have a check of the “signal” sub option of the trigger, set it to the proper channel.

Have a check of the “type” sub option of the trigger, general signal select the edge trigger and video signal select the video trigger.

Have a try to change the “mode” sub option among auto, normal and once.

6. Can not communicate with PC

Have a check that the rs232 communication line links the host machine to the pc by COM1 or other,

The software (showwave.exe) is running well on the PC, and has a right configuration such as COM1 or other.

The host machine is power on.

After get the graph of waveform, make sure the “location” is the one you want to be saved.

7. Baseline drift

When the machine is just power on, without any input signal, the baseline is off the middle screen (marked 0) quite a lot is the really drift. If the situation happens contact us for a resolution.

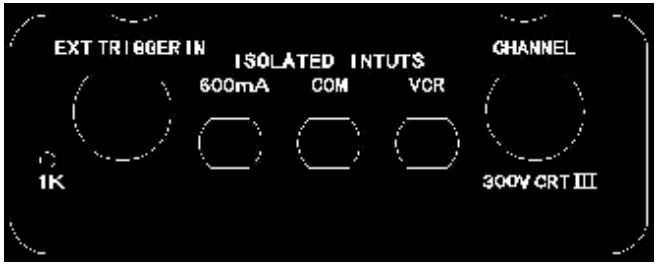
Appendix C Standard configuration

The products contain the things list below:

#	description	amount	1201	1201S	Optional
1	ZB-1201 host machine	1pcs	√		
2	ZB-1201s host machine	1pcs		√	
3	20M(10:1)probe	1pcs	√	√	
4	《user manual》	1pcs	√	√	
5	dedicated adapter	1pcs	√	√	
6	《products guarantee card》	1pcs	√	√	
7	Probe (for direct measurement)	1pair	√		
8	4000mAHlithium battery	1pcs			√
9	knapsack	1pcs			√
10	30M(100:1)probe	1pcs			√

Appendix D Definition of interface

1、 interface for input (ZB-1201)



ZB-1201 interface for input

CHANNEL: the input channel of signal;
EXT TRIGGER IN: the input channel of external trigger;
VCR: the interface for voltage、capacitor or resistor;
600mA: the interface of current;
COM: common ground;
1K: the output signal interface for test (voltage is 1V ,and the frequency is 1KHz).

2、 interface for input (ZB-1201s)

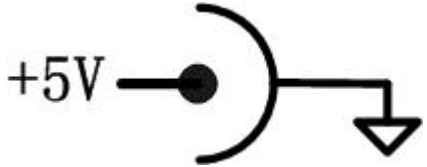
ZB-1201S输入信号的接口板

CHANNEL: the input channel of signal;

EXT TRIGGER IN: the input channel of external trigger;

1K: the output signal interface for test (voltage is 1V ,and the frequency is 1KHz).

3、**Definition of the adapter interface:**



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